UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
Forest Insect Laboratory
Coeur d'Alene, Idaho

Project h-1-13 (1) Date December 4, 1941 Author

TITLE

# THIRTEENTH ANNUAL SURVEY OF THE COEUR D'ALENE NATIONAL FOREST TO DETERMINE THE STATUS OF INSECT INFESTATIONS 1941

RECEIVED
DEC 17 1941
TIMBER MANAGEMENT

by
Tom T. Terrell
Senior Scientific Aide

COMMENTS AND RECOMMENDATIONS

by
James C. Evenden
Senior Entomologist

SUBJECT—

INDEX NO.—

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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

F.S. R-1
RECEIVED
DEC 22 1941
TIMBER MANAGEMENT
WASHINGTON

ADDRESS REPLY TO
CHIEF, FOREST SERVICE
AND REFER TO

S
CONTROL, R-1
Insect
Coeur d'Alene

December 17, 1941

Regional Forester
Missoula, Mont.

Dear Sir:

I enclose a copy of a memorandum from the Chief of the Bureau of E&PQ dated December 12, which transmitted a copy of a report entitled "Thirteenth Annual Survey of the Coeur d'Alene National Forest," 1941. The report is interesting but its chief recommendation for a control project which would cost an estimated $42,000 simply cannot be financed during the present fiscal year. Discussion of the worthwhileness of the project would, therefore, be purely academic.

I take it for granted that Mr. Evenden has supplied copies of the report to you and to the Supervisor of the Coeur d'Alene. I am writing you at this time merely so that further work in regard to this project will not be wasted. The lodgepole infestation in Region 4 has been allotted all the available funds.

Very truly yours,

E. E. CARTER
Chief, Division of Timber Management

Enclosure

2 cc R-1

12/22 - Copy sent Cd A
" Mr Evenden

extra cc

Dec. 12, 1941

To: E. H. Clapp, Acting Chief, Forest Service

From: P. N. Annand, Chief of Bureau

Subject: Forest Insect Surveys on Coeur d'Alene National Forest

In accordance with our previous custom we are submitting a report on our forest insect surveys covering the Coeur d'Alene National Forest in Idaho. It has been prepared by Mr. Evenden and Mr. Terrell of our Coeur d'Alene laboratory.

Mr. Evenden recommends control work on several areas involving the expenditure of approximately $42,000. Dr. Craighead indicates that he realizes it may be impossible to carry out this recommendation in that much more serious infestations in the central Rocky Mountains have demanded the allotment of practically all the available control funds and that it might be almost impossible to obtain a deficiency estimate for this work at this time. Dr. Craighead will discuss the situation with Mr. Carter of the Office of Timber Management.

(s) P. N. Annand

Attachment

FCCraighead:GLW
12-10-41

cc: J. C. Evenden

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

F.S. R-1
RECEIVED
DEC 17 1941
TIMBER
MANAGEMENT

December 15, 1941

To: Regional Forester, Missoula, Montana
Attention of Mr. Koch

From: James C. Evenden, Box 630, Coeur d'Alene, Idaho

Subject: Mountain Pine Beetle Infestation, Coeur d'Alene

Reference is made to my letter of December 6.

The report of the Coeur d'Alene forest insect survey has been approved and returned to this office for transmittal. A copy is enclosed and a copy is being sent to the Supervisor of the Coeur d'Alene.

James C. Evenden

Enclosure

# THIRTEENTH ANNUAL SURVEY OF THE COEUR D'ALENE NATIONAL FOREST TO DETERMINE THE STATUS OF INSECT INFESTATIONS 1941

by
Tom T. Terrell
Senior Scientific Aide

A survey of the most important white pine stands on the Coeur d'Alene National Forest was made to determine the extent of infestation by the mountain pine beetle. The survey was started on August 4 and finished September 4.

The annual survey on the forest has been cut down during the past few years because a number of the former unit areas have been logged and because some of the units show such a light infestation of bark beetles as to make it possible to survey them biennially. Prior to 1940, acreages of from 118,000 to 127,000 were surveyed annually; during 1940, 84,350 acres were surveyed; and in 1941 the survey was confined to 32,240 acres.

The following table gives a summary of the data obtained as well as a correction which has been applied to compensate for attacks occurring after the data were taken. The correction was found to be necessary because the survey was started as early in the season as possible after the main midsummer attack period was over.*

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* A method of correcting bark beetle survey data obtained prior to the completion of attack period. J. C. Evenden. 1939.

Table 1 - Mountain pine beetle infestation, Coeur d'Alene Forest survey of 1941

| Unit | Acres | Acres of plots | Attacked trees: On plots | Attacked trees: Corrected | Attacked trees per acre: On plots | Attacked trees per acre: Corrected | Green stand: On plots | Green stand: Per acre | Total infested trees | Percent of stand killed |
|---|---|---|---|---|---|---|---|---|---|---|
| Taylors | 2,800 | 76.7 | 25 | 26.7 | .33 | .35 | 1,746 | 23 | 980 | 1.5 |
| Forks-Cabin | 5,440 | 137.7 | 25 | 25.9 | .18 | .19 | 5,036 | 37 | 1,034 | .5 |
| Can Cr. | 1,760 | 26.1 | 9 | 9.4 | .35 | .36 | 700 | 27 | 634 | 1.3 |
| West Fork | 3,960 | 55.0 | 3 | 3.0 | .05 | .05 | 1,443 | 26 | 198 | .2 |
| Clay Cr. | 2,320 | 51.0 | 14 | 14.4 | .27 | .28 | 2,205 | 43 | 650 | .6 |
| Sissons | 4,700 | 156.0 | 57 | 79.5 | .37 | .51 | 4,916 | 31 | 2,397 | 1.6 |
| Yellow Dog R. | 2,140 | 58.7 | 27 | 36.2 | .46 | .62 | 1,864 | 32 | 1,326 | 1.9 |
| Yellow Dog Cr. | 4,120 | 137.8 | 32 | 40.5 | .23 | .29 | 7,967 | 58 | 1,195 | .5 |
| Downey Creek | 4,160 | 119.5 | 57 | 62.0 | .48 | .52 | 6,479 | 54 | 2,163 | .9 |
| N. Yellow Dog | 840 | 25.0 | 1 | 1.4 | .04 | .06 | 1,042 | 42 | 50 | .1 |
| Totals and averages | 32,240 | 843.5 | 250 | 299.0 | .285 | .336 | 33,398 | 39.6 | 10,627 | .9 |

In the foregoing table there are several units where the infestation is still very serious and the reduction of the stand continues much as it has for the past several years.

Table 2 will give comparative figures as to the infestation per acre on the units for the past seven years.

Table 2

| Unit | Infested trees per acre 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 |
|---|---|---|---|---|---|---|---|
| Taylors | .14 | .02 | .27* | .48 | .47 | .20 | .35 |
| Forks-Cabin | .22 | .03 | .23* | .37 | .35 | .34* | .19 |
| Can Cr. | .20 | .02 | .16 | .65 | .26 | .22 | .36 |
| West Fork | .10 | .04 | .12 | .30 | .15 | .08 | .05 |
| Clay Cr. | .27 | .06 | .24* | .47 | .25 | .41* | .28 |
| Sissons | .31 | .10 | .22 | .36 | .52* | .19 | .51 |
| Yellow Dog River | .50 | .23 | .59* | .50 | 1.15* | .41 | .62 |
| Yellow Dog Creek | .14 | .13 | .17 | .25 | .45* | .19 | .29 |
| Downey Creek | .38 | .08 | .39* | .34 | .65* | .21 | .52 |
| North Yellow Dog | .80 | .03 | .11 | .20 | .36* | .03 | .06 |

* Control measures applied

A study of table 2 will show that the infestation on the units surveyed in 1941 is, generally speaking, about the same as it has been in the past. There are exceptions, especially in those units where control measures have been applied. While no apparent results were obtained in 1938 from the 1937 project, the 1939 control measures seem to have effected a temporary reduction in the infestation. The experimental project of 1941 shows very noticeable results in the Forks-Cabin unit as a whole; however, the area of concentrated attacks in the central portion is reinfested to a serious extent. Only a portion of the Forks-Cabin and Clay Creek units were controlled in the spring of 1941, and no great reduction was expected. The photographic map will show the control area and the adjacent Steamboat unit.

Units

1. Clay Creek
2. Forks-Cabin
3. West Fork
4. Can Creek
5. Taylors

Hatched area - 1941 spring control project

A brief description of the units will be given because there are certain differences in the character of the infestation within each unit.

STEAMBOAT DRAINAGE

Taylors Unit 2,800 acres

| | |
|---|---|
| Infested trees per acre | .35 |
| Percent of stand killed | 1.5 |
| Infested trees on unit | 980 |

The mountain pine beetle infestation in the Taylors unit is almost entirely confined to the area west of Steamboat Creek, where it seems to be concentrated in the 80-year-old stand of Omaha Creek and in a portion of section 10 north of Omaha Creek.

The infestation in this area presents a problem that is hard to evaluate. The stand is young and is growing on a good site, but the trees are apparently not healthy and many of them are dying from some cause other than insects. Similar circumstances have been noted in other stands of this type on the Kaniksu and Kootenai Forests. The trees are as a rule rather limby and of a poor color and do not seem to have much resistance to insect or fungi.

Forks-Cabin Unit 5,440 acres

| | |
|---|---|
| Infested trees per acre | .19 |
| Percent of stand killed | .5 |
| Infested trees on unit | 1034 |

Although the 1941 infestation in this unit has decreased nearly 50 percent from that of 1940, the infested trees are still concentrated in the area controlled. Apparently the area within the control boundaries

is more susceptible to insect attack than the rest of the unit. The area includes all of the steeper, drier slopes, which indicates that soil moisture may be a factor in making this area so attractive to the insects.

A compilation of the sample plots taken in section 22 shows an infestation of .83 infested trees per acre - a total of 530 infested trees on the section. Nearly all of the infested trees on section 22 are early attacks - many, in fact, were attacked by early emerging insects while the control project was in operation. A series of sample plots was taken in section 22 early in July, which was before any general emergence, and the data showed an infestation of .75 infested trees per acre.

About one-half of the infested trees in this unit are quite heavily attacked, while the rest were found to be lightly infested, one-sided attacks occurring on dry slopes.

Can Creek Unit 1,760 acres

| | |
|---|---|
| Infested trees per acre | .36 |
| Percent of stand killed | 1.3 |
| Infested trees on unit | 634 |

Most of the infested trees in this unit occur on a series of steep dry ridges along the south side of Can Creek, where the type is mixed with Douglas fir. Severe past kill of both Douglas fir and white pine along these ridges has opened the stand up until the site seems hardly capable of sustaining a white pine stand.

West Fork Unit 3,960 acres

| | |
|---|---|
| Infested trees per acre | .05 |
| Percent of stand killed | .2 |
| Infested trees on unit | 198 |

The infestation in the West Fork unit seems to be returning to a normal status. For several years there were a number of trees killed on the dry southern exposure in sections 32 and 33, just west of the Steamboat Lookout. This area is dry and very brushy and the stand was heavily mixed with large Douglas fir. Apparently the more susceptible trees have been killed out because there were only a very few infested trees found in the entire area.

It was also noted that there was a marked decrease in the Douglas fir beetle infestation which has been killing large numbers of Douglas fir annually for the past several years.

Clay Creek Unit 2,320 acres

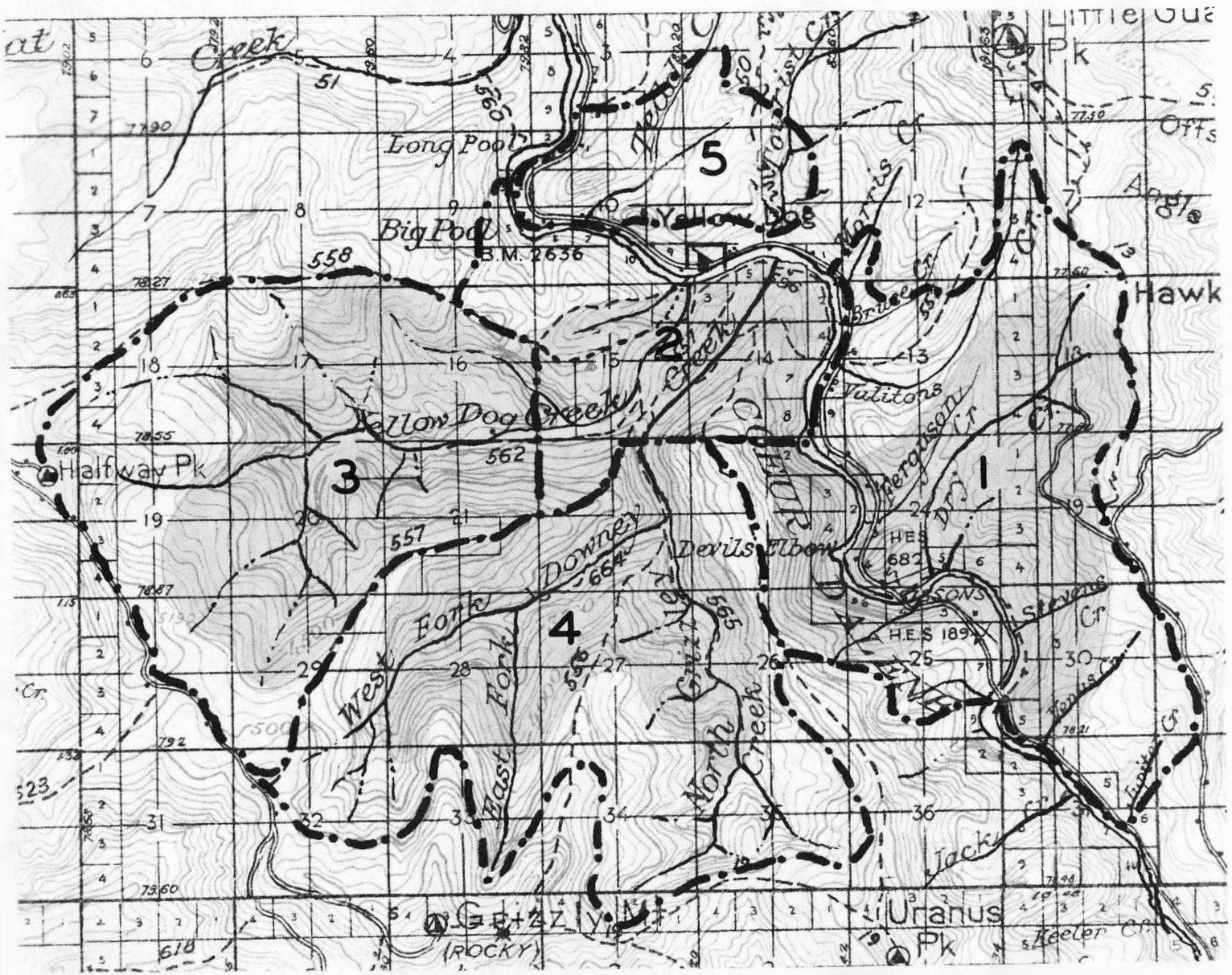
| | |
|---|---|
| Infested trees per acre | .28 |
| Percent of stand killed | .6 |
| Infested trees on unit | 650 |

In considering this unit as a whole, a decrease occurred in the infestation during the 1941 season, in about the same proportion as the decrease in the Forks-Cabin unit. All of the more heavily infested parts of the unit were worked during the 1941 spring control project, and the treatment of the infested trees is undoubtedly the reason for the decrease in both of these areas.

Most of the present infestation is to be found scattered over the unit inside the control area boundaries where most of the infested trees have occurred in the past; along Clay Creek on both sides and in the Martin Creek drainage along the northern side.

## COEUR D'ALENE RIVER UNITS

Because of the importance of the infestation in the group of units along the Coeur d'Alene River a map is presented to show more clearly the relationship of the areas described. The colored area will show where most of the infested trees are to be found.




Units

1. Sissons
2. Yellow Dog River
3. Yellow Dog Creek
4. Downey Creek
5. North Yellow Dog

Shaded area contains most of the infested trees.

Sissons Unit 4,700 acres

| | |
|---|---|
| Infested trees per acre | .51 |
| Percent of stand killed | 1.6 |
| Infested trees on unit | 2,397 |

The infestation in the Sissons unit is not very evenly distributed; very few infested trees ever occur in section 30 on the eastern side of the Coeur d'Alene River near the Sissons bridge, or in section 25, which lies west and north of the bridge. The greater number of the infested trees are to be found in the eastern half of section 23, section 24 and the western half of section 19, and to a lighter extent in sections 13 and 18, which lie to the north.

Practically the entire infestation occurs in this part of the unit, which has 3,260 acres. The infestation on this smaller acreage is about .7 of an infested tree per acre.

About one-half of the infested trees examined were heavily attacked, while the rest were rather poor, one-sided attacks occurring on the drier slopes. The infested trees are to be found in small groups as well as scattered single trees.

Yellow Dog River Unit 2,140 acres

| | |
|---|---|
| Infested trees per acre | .62 |
| Percent of stand killed | 1.9 |
| Infested trees on unit | 1,326 |

The infestation in this unit is fairly uniform throughout the colored area as shown on the map. The small unshaded part of about 400 acres extending south of Big Pool to the Yellow Dog Creek ridge and east along the Coeur d'Alene River is not badly infested. This area is a mixed type with considerable hemlock and fir, and runs largely to a

pole type stand on a northern exposure. The infestation has always been light in this small area and very few infested trees were found this year.

On the balance of the unit there is probably a somewhat heavier infestation on the bench-like area between Downey Creek and the Coeur d'Alene River in section 14. This area is 500 acres in extent and has an infestation of about 1 tree per acre. Severe past insect kill has reduced the stand by nearly 50 percent on the more level areas, but the infestation seems to end rather abruptly at the base of the steeper ground to the south.

The unit as a whole has suffered a severe constant loss for a number of years and as a result there are many spots and larger areas within the unit where the loss of the white pine is very noticeable. This is especially true of the ridge between Yellow Dog and Downey Creek in sections 14 and 15. There are numerous spots along the ridge of from an acre to several acres in size where there is very little white pine left.

Yellow Dog Creek Unit 4,120 acres

| | |
|---|---|
| Infested trees per acre | .29 |
| Percent of stand killed | .5 |
| Infested trees on unit | 1195 |

The infestation in the Yellow Dog Creek unit is not as severe as in the adjacent Downey Creek and Yellow Dog River units. The attacked trees occur mostly as scattered single trees throughout the unit except in the extreme heads of the drainages, where the infestation is not as extensive. Most of the infestation would be found on

2,800 acres of the drainage, which would be about .4 of an infested tree per acre.

Downey Creek Unit 4,160 acres

| | |
|---|---|
| Infested trees per acre | .52 |
| Percent of stand killed | .9 |
| Infested trees on unit | 2163 |

The infestation in the Downey Creek unit is to a large extent confined to an area of about 2,500 acres that extends along Downey Creek and its forks as well as along North Grizzly Creek. The area does not extend more than a half mile on either side of these drainages, but it includes most of the white pine in the area. The higher elevations are largely covered with a mixture of white pine, lodgepole pine, and fir.

The attacked trees can roughly be divided into two classes: Those on the dry southern exposures are generally attacked on one side and they occur as a scattered infestation in which there are not many groups of infested trees. The white pine stand on some of these drier sites has been killed out by insects until only about a fourth of the original stand remains. The infested trees on the northern exposures, however, are often found in groups and the trees are more heavily attacked.

The figure given for the Downey Creek unit was based on 4,160 acres with an infestation of .52 of an infested tree per acre, or 2,163 infested trees. Because most of these trees are actually on a smaller acreage, the infestation per acre on the 2,500 acres is about .8 of an infested tree per acre.

North Yellow Dog Unit 840 acres

| | |
|---|---|
| Infested trees per acre | .06 |
| Percent of stand killed | .1 |
| Infested trees on unit | 50 |

The North Yellow Dog unit comprises a small area lying north of the Coeur d'Alene River between Tourist Creek and Long Pool. Teddy Creek is the principal drainage.

There have been a few severe infestations in this unit in the past, but they were, as a rule, of short duration - either decreasing suddenly without any artificial control or responding well when control measures were applied. Usually the infestation has largely been confined to the flats between Big Pool and Long Pool on the river and on the northern exposures in Teddy Creek. The infestation always seemed to occur in large groups with only a relatively few single trees. The fact that the area is somewhat isolated from other white pine stands might be the reason for the rather peculiar behavior of the infestation.

Very little infestation has been found on the area for the past few years, although there are now a few groups of infested trees on the Big Pool flats.

## CONCLUSIONS

The mountain pine beetle infestation in the white pine stands of the units surveyed in 1941 has increased to some extent in all of the more heavily infested units except those where control measures were applied last spring. In the units where control measures were undertaken (Forks-Cabin, Clay Creek) the infestation as a whole decreased, but a part of the area within the control area boundary is reinfested to about the same extent as in 1940.

A group of four units along the Coeur d'Alene River (Sissons, Yellow Dog River, Yellow Dog Creek, and Downey Creek) are reinfested to a serious extent, but not to the extent that they have been in years of high infestation. After the control work which was done in these units in the fall of 1939 a decrease occurred in 1940. However, the decrease was evidently not of a permanent nature and the infestation is now in much the same status as in 1938, if we consider these units as one block.

The infestation within these areas is not, generally speaking, highly epidemic. It seems to be partially due to the condition of the stands.

The apparently weak, nonresistant trees growing on dry southern sites are not heavily attacked and do not have the appearance of trees that are primarily killed by the mountain pine beetle. The loss of these trees is caused by a progressive type of kill where one or more sides are killed in successive years. The cause of the killing seems to be primarily from sun scald because the more exposed sides of the trees are nearly always killed first. The drying side is usually infested by a few mountain pine beetles and secondaries. These attacks evidently induce further infestation in the succeeding years until the tree eventually succumbs. As the trees die, openings appear in the forest canopy, which in turn cause further drying out and sun damage. The evidence of this progressive loss is very apparent on all of the drier exposures in the forest, and in the Coeur d'Alene River unit it has assumed such proportions that there are many areas of 75 percent kill.

In the more vigorous trees which are found along the creeks and on the northern exposures, the infested trees are usually attacked by greater numbers of insects. They are evidently the primary factor in the destruction of the trees. Roughly, about one-half of the insect-infested trees fall into each of these two classes.

## COMMENTS AND RECOMMENDATIONS

by
James C. Evenden
Senior Entomologist

Annual surveys of the Coeur d'Alene National Forest have provided a history of the mountain pine beetle infestation which is of value in understanding the entomological problems of the area. During the thirteen years these surveys have been conducted a program of maintenance control has followed the large initial control project of 1930. With but few exceptions all recommendations for the institution of control in connection with this program were adopted and put into effect. Obviously the results obtained must speak for the success of this effort, but unfortunately an accurate and provable evaluation is difficult to make. Being familiar with what has happened in portions of other forests of this region where such protection was not afforded, we feel that the present condition of the Coeur d'Alene National Forest is sufficient evidence of the benefits derived.

Unfortunately the policy which governed recommendations for the institution of maintenance control against potentially dangerous infestations has been influenced somewhat by the funds which were available. Possibly a more permanent success would have followed a more intense program of control; however, this is but a conjecture without much basic foundation.

In table 2 of Mr. Terrell's report are listed the areas surveyed during the past season, and through the infested-tree-per-acre figure he has shown the changes in the status of the infestation for the past seven years. This table also indicates the years and areas where control measures were conducted. In Mr. Terrell's discussion of this table he stated that there were no apparent results to be seen from the 1937 control operation, as the following season there was an increased infestation in all treated areas. In this remark there was no intention of implying that the 1937 operation was not successful, for when control is directed against virulent increasing infestation, as was the case in this instance, greater benefits are derived than when declining outbreaks are treated, although in the latter instance the results are more obvious.

The Sissons, Yellow Dog River, Yellow Dog Creek, and Downey Creek units again show a marked increase in the severity of this year's infestation:

| | Infested trees per acre | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 |
| Sissons | .31 | .10 | .22 | .36 | .52* | .19 | .51 |
| Yellow Dog River | .50 | .23 | .59* | .50 | 1.15* | .41 | .62 |
| Yellow Dog Creek | .14 | .13 | .17 | .25 | .45* | .19 | .29 |
| Downey Creek | .38 | .08 | .39* | .34 | .65* | .21 | .52 |

* Control measures applied.

Present methods of artificial control successfully reduce bark beetle populations and eliminate threats of serious epidemics, but they do not change the brood increase potential of residual infestations within treated and adjacent areas. This would seem to explain the story

of control in these four units, for although a satisfactory reduction followed the institution of control in 1939, a high brood increase potential remained, with the result that the infestation is again rebuilding to its former severity. It is true that in 1937 there were no visual results obtained from the control measures which were instituted in the Yellow Dog River and Downey Creek units. However, during that season small portions of these two units were covered by control, and as a high increase potential existed, it is obvious that the results were more effective than indicated by the status of the infestation in 1938. Although the brood potential of the present infestation within these four units is not as high as in 1939, there is no reason to assume that there will not be a further increase in its severity in 1942.

We consider the timber stands within these units as being quite susceptible to infestations of the mountain pine beetle. This belief has of course been based upon the severe losses that have occurred and the persistence of the infestation. It is difficult to determine the success of the control program within these units, but there is no question but that devastating outbreaks have been prevented and a large percent of the present timber stand temporarily preserved. Because of the susceptibility of these timber stands to mountain pine beetle infestations, there can be no more assurance of permanency in the results of future control operations than has been obtained from past projects. It is true that future control can be expected to hold the annual loss to a minimum by eliminating severe outbreaks which would destroy in a few years a large portion of the present white pine stand.

Obviously the seriousness of the present situation within these units depends somewhat upon the percent of the timber stand that is being destroyed. In table 1 of Mr. Terrell's report he shows that the percent of the residual merchantable stand that was killed in 1941 was as follows:

| | |
|---|---|
| Sissons | 1.6% |
| Yellow Dog River | 1.9% |
| Yellow Dog Creek | .5% |
| Downey Creek | .9% |

This loss is for the 1941 season only, and is associated with a light but potentially dangerous infestation.

As these stands are not to be harvested for some years, proper protection is essential in order that they may be preserved for the purpose to which they have been allocated. It is therefore recommended that control measures be directed against the infestation within the Sissons, Yellow Dog Creek, Yellow Dog River, and Downey Creek units in the spring of 1942. To treat the estimated number (7000) of infested trees an expenditure of some $42,000 will be required.